

ATI-0016

REMARKS

Claims 1-17 were pending in the present Application. Claims 1, 7, 9, 13, and 17 have been amended and Claims 18-20 have been added, leaving Claims 1-20 for consideration upon entry of the present amendment.

The Specification at paragraphs [0020], [0031] and [0034] have been amended to correct certain typographical errors. Support for the amendment to Claims 1, 9, and 17 can be found in paragraph [0031]. Support for newly added Claims 18-20 can be found in the same paragraph [0031]. Support for the amendment to Claim 7 can be found in paragraph [0029]. Claim 13 was amended to correct the informality noted by the Examiner. No new matter has been introduced by these amendments.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Rejection Under 35 U.S.C. § 112, Second Paragraph

Claim 13 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the term "the pressure" lacks proper antecedent basis. Claim 13 has been amended, which has now rendered the rejection moot. Accordingly, Applicants request the Examiner to withdraw the rejection of Claim 13.

First Claim Rejection Under 35 U.S.C. § 102

Claims 1-5, 7-13, 16, and 17 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 6,319,809 to Chang et al. (hereinafter "Chang"). Applicants respectfully traverse.

Chang is generally directed to a method to reduce via poisoning in a low k copper dual damascene structure through an ultraviolet (UV) radiation treatment.

To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Barient Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

ATI-0016

Chang fails to anticipate independent Claims 1, 9, and 17 because Chang fails to disclose a process comprising, *inter alia*, removing air from the process chamber as claimed by Applicants. In Chang, the ultraviolet irradiation is described as being preferably "performed in nitrogen or ozone rich environment." (see Chang, Col. 6, ll. 31-32) There is no disclosure that the air is removed from the process chamber prior to irradiation. Having a nitrogen rich environment does not equate to a process chamber free of air. It is well known that UV is absorbed by ozone and can be dissociated. Moreover, it is well known that UV exposure of air can also create ozone. The resulting reactive chemistry would actually be very detrimental for the applicants' process, since low k materials can be oxygen-sensitive. In contrast, the applicants use the inert ambient to ensure that there is no oxygen or water vapor present in the ambient environment during exposure, and so that the radiation can reach the surface of the low k material unattenuated.

Accordingly, the rejections of Claims 1-5, 7-13, 16 and 17 should be withdrawn.

Second Claim Rejection Under 35 U.S.C. § 102

Claims 1-5 and 7-17 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 6,303,524 to Sharangpani et al. (hereinafter "Sharangpani"). Applicants respectfully traverse these rejections.

Sharangpani is directed to a method for curing low k dielectric materials. The curing process is employed to form the low k dielectric layer. Sharangpani fails to anticipate independent Claims 1, 9, and 17 because Sharangpani fails to disclose a process comprising exposing a low k dielectric layer to, *inter alia*, photons as in Claim 1, radiation comprising a wavelength of about 150 nanometers to about 500 nanometers as in Claim 9, or electromagnetic radiation as in Claim 17. Rather, Sharangpani discloses a process for forming the low k dielectric layer by curing a film containing the low k dielectric monomers. As noted in Sharangpani, the process of "curing" is generally done to initiate polymerization or crosslinking to convert the low k dielectric material to a low k dielectric constant coating layer having the desired properties. Once formed, the curing process is then stopped. There is no disclosure of a drying process for removing contaminants as claimed by Applicants.

ATI-0016

Accordingly, Applicants respectfully request withdrawal of rejections to Claims 1-5 and 7-17.

Third Claim Rejection Under 35 U.S.C. § 102

Claims 1, 2, 5-8 and 17 stand rejected under 35 U.S.C. § 102(e), as allegedly anticipated by U.S. Patent No. 6,452,275 and 6,559,045 to Chung (hereinafter "Chung"). Applicants respectfully traverse these rejections.

Chung is generally directed to the formation of integrated circuits with borderless vias in microelectronic devices. The integrated circuit structure comprises two different kinds of low k dielectric materials, which may be optionally heated to expel residual solvent.

Applicants' independent process Claims 1 and 17 are "effective to remove the contaminants without causing degradation of the low k dielectric layer." As noted in Chung, the dielectric layer may also "optionally be exposed to actinic light, such as UV light, to increase its molecular weight" (see Chung, Col. 9, ll. 64-66). As such, the only disclosure related to UV light exposure is for its explicit teaching that the process be effective to increase the molecular weight of the low k dielectric layer. Increasing the molecular weight will change dielectric constant. Consequently, Chung's disclosed process as it relates to UV light exposure would cause degradation of the low k dielectric layer in the form of an increased molecular weight. Moreover, the disclosed process as it relates to UV light exposure would not dry or remove contaminants from a low k dielectric layer.

Accordingly, the rejections of these claims should be withdrawn.

First Claim Rejection Under 35 U.S.C. § 103(a)

Claim 6 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Sharangpani. Applicants respectfully traverse this rejection.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed

ATI-0016

in the prior art. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

As discussed above, Sharangpani is generally directed to curing processes. The curing process generally includes curing low k dielectric materials to form a low k constant dielectric layer by initiating crosslinking and/or polymerization of the dielectric materials (see Sharangpani, Col. 3, ll. 1-43). Sharangpani's curing process decreases the curing times associated with the prior art. However, a curing process is markedly different from a drying process for removing contaminants as claimed by Applicants.

Accordingly, the rejection of Claim 6 should be withdrawn for at least this reason.

Second Claim Rejection Under 35 U.S.C. § 103(a)

Claims 6, 14, and 15 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Chang. Applicants respectfully traverse.

Applicants respectfully assert that a *prima facie* case of obviousness has not been established against independent Claims 1 or 9 because Chang fails to teach or suggest a drying process comprising, *inter alia*, removing air from the process chamber prior to exposing the low k dielectric layer to photons or radiation as claimed by Applicants. Rather, Chang teaches and suggests that the irradiation is performed in nitrogen or ozone rich environment. As previously discussed, the use of a nitrogen rich or ozone rich environment does not equate to a process that removes air from the process chamber prior to exposing the low k dielectric layer to photons or radiation. The presence of air can detrimentally affect the dielectric material during radiation to photon exposure. Moreover, the fact that Chang teaches and suggests the use of ozone clearly indicates that Chang fails to appreciate the advantages of removing air.

It is also noted that Chang teaches the use of ultraviolet irradiation as a pre-treatment to avoid or reduce subsequent via poisoning (see Chang, at Col. 1, ll. 52-64, Col. 3, ll. 61-62, and Col. 6, ll. 10, 62-64). The Applicants teach "drying" and "contamination-removal"

ATI-0016

methods that dry and/or remove contaminants after the contaminants are introduced into the low k material, while not degrading the low k material. As such, the processes are markedly different from one another and occur at different stages in the integrated circuit manufacturing process. Also, it is noteworthy that degradation of the low k material will manifest itself in increased capacitance, while via poisoning usually manifests itself as increased resistance.

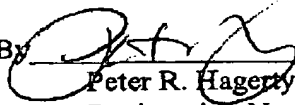
As all elements of independent Claims 1 and 9 have not been taught, these claims are patentable over Chang. Given that Claims 6, 14 and 15 each further limit and ultimately depend from one of these independent claims, they too are patentable. Accordingly, the rejection of Claims 6, 14 and 15 are requested to be withdrawn.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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